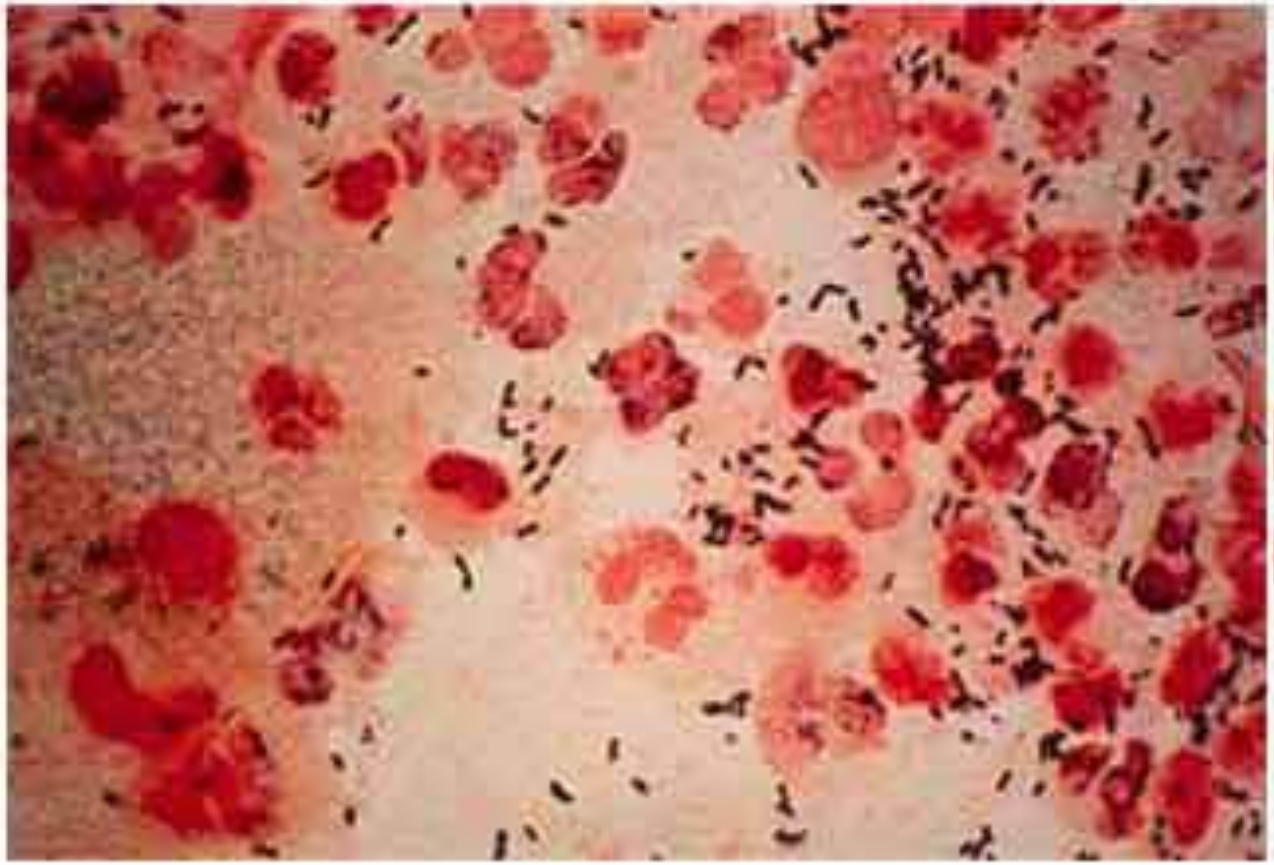
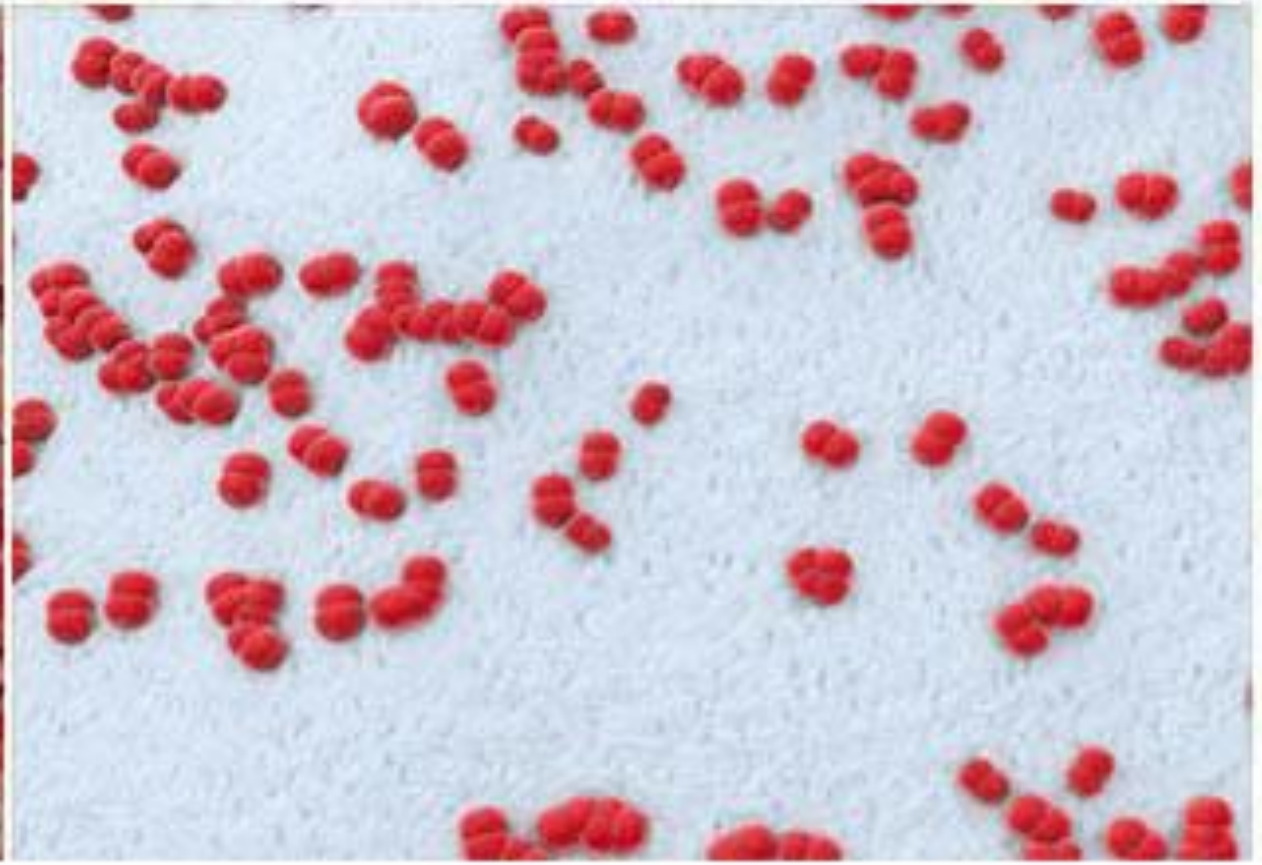
Genus; Neisseria

General Characteristics

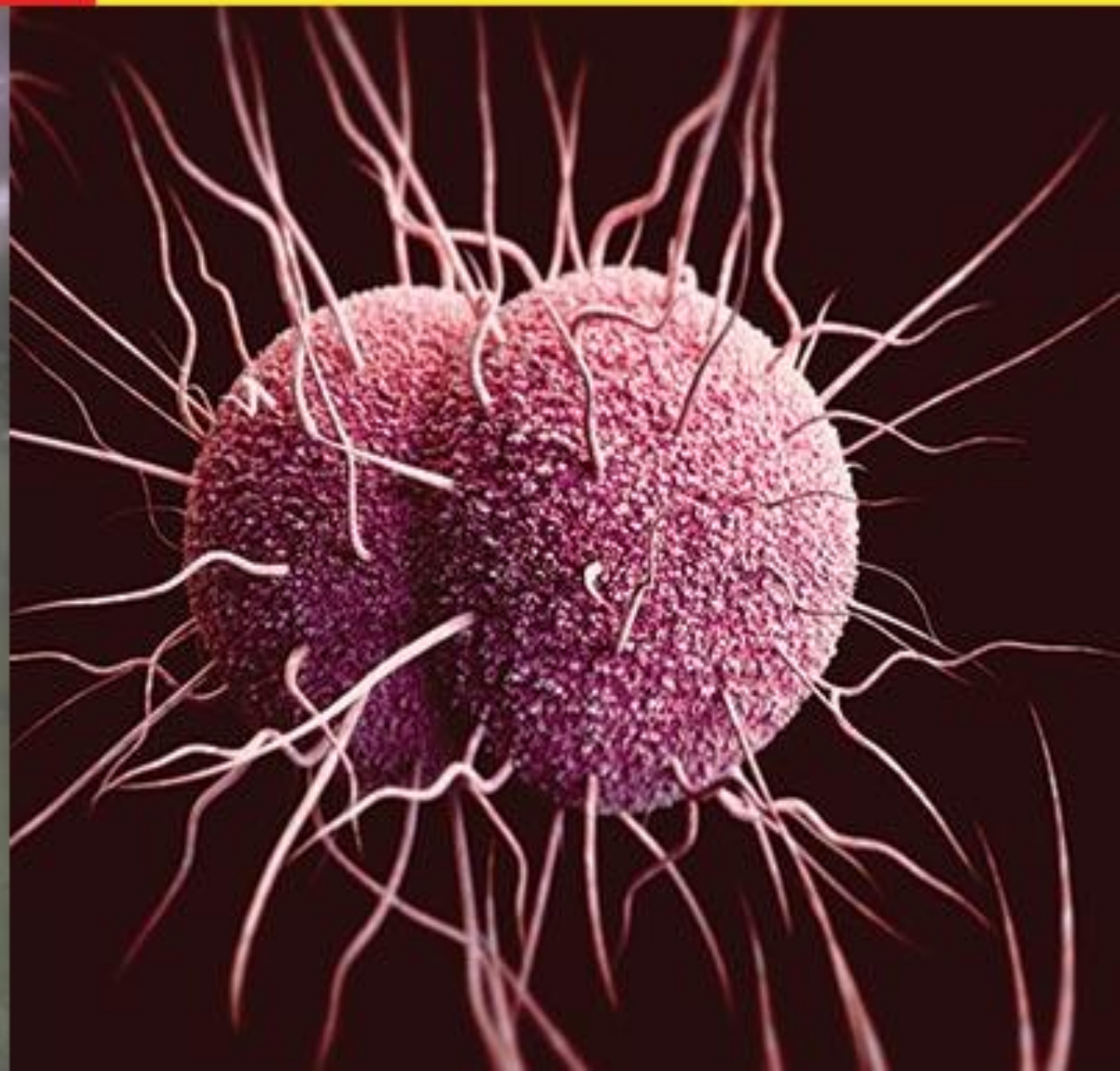
- N. gonorrhea (also called the gonococcus), which causes gonorrhea.
- N. meningitidis (also called the meningococcal), one of the most common causes of bacterial meningitis and the causative agent of meningococcal septicemia.

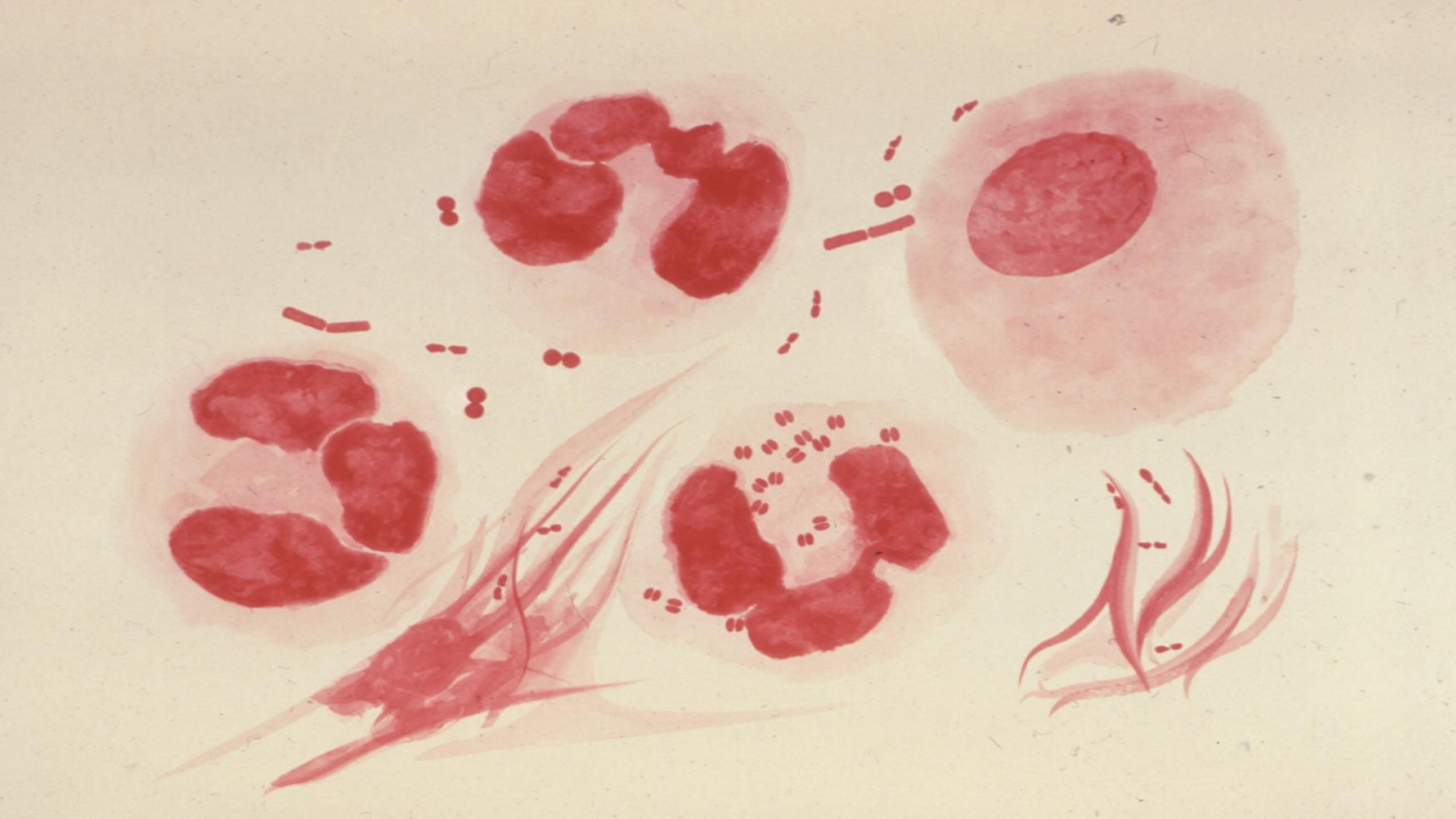
Neisseria gonorrhoeae VS *Neisseria meningitides*





Neisseria meningitidis Vs *Neisseria gonorrhoeae*





- The Neisseria cells appear in pairs, bean like opposite to each other,
- they are non motile,
- very fastidious organism, need either serum or heated blood with some supplement (antibiotics specially for the first isolation),
- it dose not grow well on blood agar because it lake enzymes which destroy (lysis) RBC,
- optimum condition for growth is present of CO2 5-10% with moisture and 3 7C 0 for the pathogenic strain,
- they are oxidase, catalase positive & can reduce nitrate.
- Found associated with or inside polymorphnuclear leukocytes while other Neisseria are normally inhibiter of human respiratory tract and occur extracellulary.
- Gonocci and meningococci are closely related with 70% DNA homology & differentiated by few lab. test and specific characteristic.

General Characteristics of Neisseria spp.

- **Aerobic**
- **Gram-negative** cocci often arranged in pairs (**diplococci**) with **adjacent sides flattened** (like coffe beans)
- **Oxidase positive**
- Most **catalase positive**
- Nonmotile
- Acid from oxidation of carbohydrates, not from fermentation

- **N. meningitidis capsulated, this ssp. Contain 4 serotype Ag, type A is responsible for about 95% of the cases isolated from CSF & from blood.
- **N.gonorrhoea include 16 serotype, the Ag of pili 1s the base of seroclassification,gonococci characterized by ability to produce B-lactamase which inhibit penicillin antibiotic, isolated from urethral discharge and blood.

Laboratory Diagnostic tests:

- 1- Gram stain.
- 2- Oxidase test (+ve)
- 3- Carbohydrates fermentation (Muller-Hinton+ bromothymol blue indicator+ pH (6-7)+ 10% sugar: lactose , sucrose, glucose, maltose, fructose)
- 4- Streaking on chocolate agar (for colony morphology and pigmentation): the colonies appear very small, concave and greenish on choclate agar.
- 5- Blood agar
- 6- Nitrate and nitrite reduction test: inoculate 1-2 loop full of culture to nitrate broth(NO_3) ----+ incubation 24 hr. at 37 C0 ----+ 2 ml of nitrate media add 5 drops of Sol. A (N,N-Dimethyl-a-naphthylamine) + sol. B (sulphanilic acid) (Reagents A and B should be protected from light and stored in the refrigerator) and after 30 sec

Neisseria gonorrhoeae: oxidation of sugars

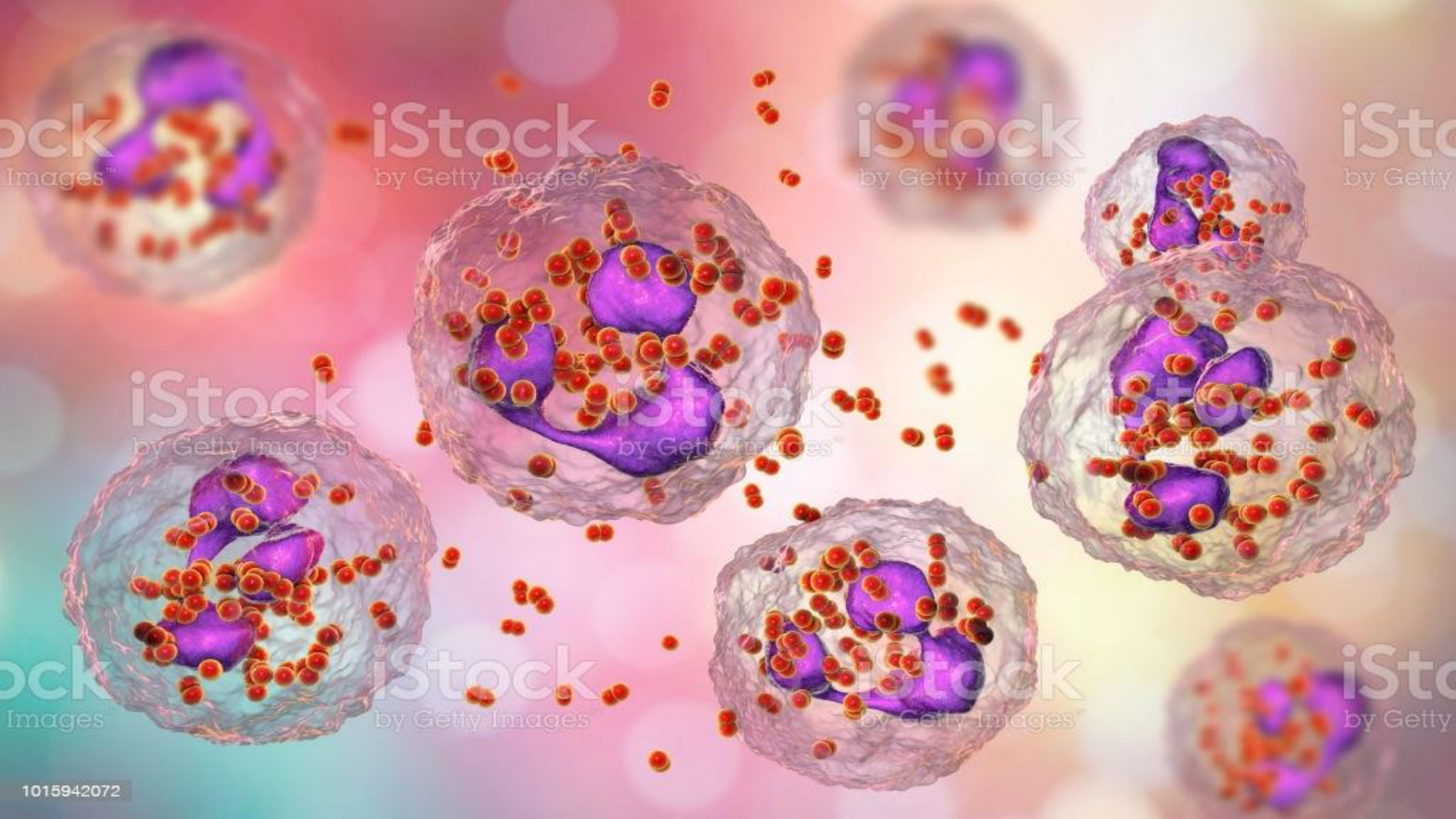
CTA test:

- Only glucose (dextrose) tube shows production of acid (yellow turbidity in upper part of tube)
- The maltose, sucrose and lactose tubes show no acidification (red colour persists in the whole tube)

API NH gallery

- Only glucose +

Test	N.gonorrhoea	N.meninngitidis
Glucose	+	+
Maltose	_	+
Lactose	_	_
Fructose	_	_
Sucrose	_	_
Pigment	Grayish-white	Grayish-white
CO2 requirement	necessary	Not - necessary
Growth at + + 35 C0	+	+
NO2 reduction	_	v
Morphology	Smooth, non-capsulated	Transparent, flattened, mucoid if capsulated


iStock
by Getty Images
1015942072

Neisseria meningitidis

Culture

The organism is cultured on blood agar or chocolate agar incubated at 37°C in a 5% CO_2 atmosphere. Colonies are 1-2 mm in diameter, convex, grey and transparent. No hemolysis

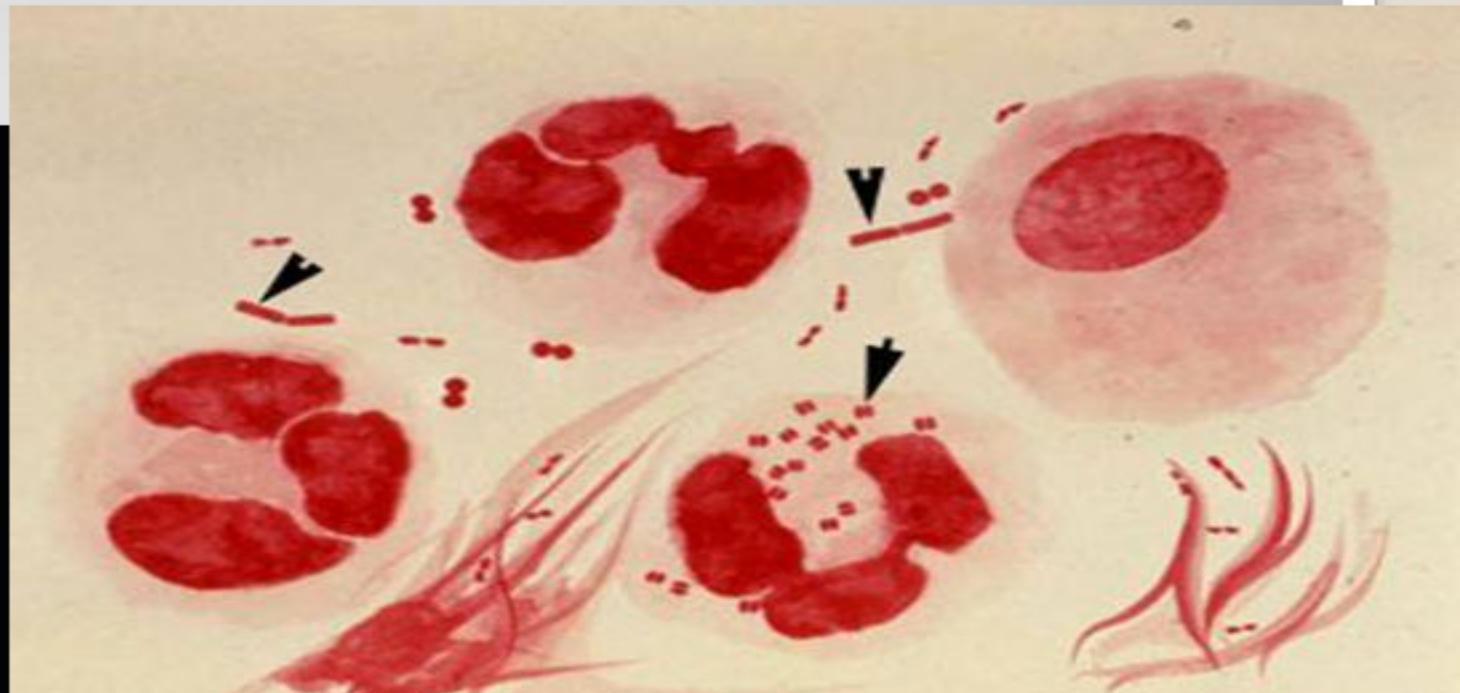
Grow well in Chocolate – Blood Agar, MHA

Selective media– THAYER – MARTIN media

Enriched agar with blood and antibiotics (Vancomycin, Colistin, Nysatin, Trimethoprim)

Colonies observed as Small, grey, glistening colonies. Produce 4 types

Type 1 & 2 – Brown,Pilate , Virulent
Type 3 & 4 -- Non pilate , Avirulent



Neisseria

- Culture and growth
  - Difficult to grow – require enriched media enhanced by CO_2
  - Chocolate agar that contains antibiotics (modified Thayer-Martin medium)
  - Oxidase positive